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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/586,115	06/02/2000	Rodolfo Milito	P3807	6216

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EXAMINER	
HIRL, JOSEPH P	

ART UNIT	PAPER NUMBER
2121	10

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/586,115	MILITO ET AL.	
	Examiner	Art Unit	
	Joseph P. Hirl	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This Office Action is in response to an AMENDMENT entered July 11, 2003 for the patent application 09/586,115 filed on June 2, 2000.

2. All prior office actions are fully incorporated into this Final Office Action by reference.

3. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris,* 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP page 2100-8, col 2 lines 45-48; page 2100-9, col 1, lines 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

Status of Claims

4. Claims 1 and 12 are amended. Claims 1-23 are pending.

Response to Arguments

5. Rejection of Claims 1 and 12 under 35 USC 101 is withdrawn.

6. Rejection of Claims 1 and 12 under 35 USC 112, first paragraph, is withdrawn.

7. Applicant's arguments filed on July 11, 2003 related to Claims 1-23 have been fully considered but are not persuasive.

8. The single issue at hand concerns whether or not Lakshman et al, concerning packet rule classification, "assigns a sequence of binary numbers to each interval between breakpoints such that all adjacent intervals are numbered in ascending sequential order?" In response, the applicant is directed first to para 3 above wherein the Examiner will interpret all claims in the broadest reasonable manner. Second, the applicant is directed to Lakshman at Figure 4 whereon Lakshman assigns a sequence of binary numbers to each interval between breakpoints such that all adjacent intervals are numbered in ascending sequential order as evidenced by the binary notation in sequential order from 0000 to 1111 related to each interval or breakpoint set.

In reference to Applicant's argument:

The Examiner has again kindly provided a lengthy and substantive "Response to, Arguments" portion of the instant Office Action assiduously reflecting applicant's arguments, providing a detailed response to each. Applicant is very much appreciative of the Examiner's efforts. However, applicant notes that, in the several responses provided by the Examiner to applicant's previous arguments, the Examiner still has not directly refuted applicant's arguments on the merits, that Laksbman does not anticipate what is claimed relative to the binary numbering of each interval between breakpoints in ascending order. Specifically, the Examiner's responses to applicant's arguments beginning on page 5 of the instant Office Action, that applicant's invention as claimed clearly discloses numbering the intervals formed between breakpoints. The Examiner responds to the specific arguments by stating that the above 101 and 112 rejections, and paragraph 3 of the instant Office Action apply, rather than dealing with the limitation Regarding the Examiner's 102 rejection, of applicant's claims 1-23, the Examiner stated in the instant Office Action that, regarding claim 1, Lakshman anticipates all of the limitations of applicant's claim inching numbering intervals between break points in sequential ascending binary numbers, and locating the binary numbered interval into which the point projects on each axis by performing a search on each axis for the numbered

interval into which the point projects on that axis for determining rules applicable to the packet. Applicant respectfully but strongly disagrees.

The Examiner notes that a set of break points constitutes an interval. Applicant agrees, but also wishes to make very clear to the Examiner that applicant's invention teaches assigning sequential binary numbers to each interval between the breakpoints, and then using these assigned numbers, which are emphatically not the breakpoint values, or bearing any specific relationship to the breakpoint values, and Lakshman clearly and unarguably does not teach. this specific limitation. Applicant's invention teaches the application of assigned binary numbers, and using the binary numbers assigned to the intervals in performing the search on each axis. Said assigned binary numbers are not, and have nothing whatsoever to do with values on the axes.

Examiner's response:

Para 8 above applies. 101 and 112 rejections were appropriate and sufficiently described. Lakshman is determining the appropriate rule classification interval. To one of ordinary skill in the art, routers are special PCs' and PCs' are binary machines. PC's have anticipated the applicant's binary methodology by a number of decades. Specification at Fig. 2 specifically identifies the association of Breakpoint with Interval. It is important to note that Breakpoint is singular, sequential and binary coded hexadecimal. The applicant is again directed to para 3 above and reminded that the Examiner will interpret the Claims in the broadest reasonable manner.

In reference to Applicant's argument:

Specifically, to further clarify to the Examiner the key and patentable distinction of applicant's disclosure, applicant now wishes to direct the Examiner's attention to applicant's Fig. 1, illustrating a mapping of three rules onto two axes representing two header fields for a packet. In the example given, there are a total of seven intervals formed by the values of the breakpoints. Seven different binary numbers are sequentially assigned to the intervals between the breakpoints, one binary number being assigned to each interval such that all adjacent intervals are binary numbered in ascending sequential order. As illustrated in applicant's Fig. 2, a table then relates interval numbers and bitmaps of rule association by interval.

The Examiner states on page 8 of the instant Office Action that Lakshman arbitrarily numbers intervals between breakpoints. Applicant is perplexed by the fact that the Examiner renders applicants above specific claim language as unpatentable vague, but applies the specific language in the reference. Applicant respectfully but urgently requests that the Examiner please provide applicant the specific language in tile reference which discloses said limitation as recited in applicant's claims.

It seems the Examiner has simply employed the common tactic of quoting applicant's claim language and attributing it to the reference, rather than the much more useful, but more difficult process of relating actual teaching from tile reference to the claimed limitations. The reference should be quoted for what it says. We request that the Examiner quote the actual reference teach and then argue how that teaching reads on applicant's claim. The Examiner is citing portions of the reference, then quoting portions of applicant's claim language which are plainly and clearly not mentioned in the reference. What the Examiner relates to the reference is conjecture.

Examiner's response:

It appears that the applicant agrees with the Examiner concerning the binary nature of the breakpoints and the reference to Fig.2 as the Examiner cited above. In the spirit of compact prosecution, comments will be made related to concurrent processing. Further discussion at the point of "arbitrarily" are of course moot by the action now taken by the applicant. The applicant is again directed to para 3 above and specifically to the concept that the claims and only the claims form the metes and bounds of the invention. In logic, one always initiates the action relevant to that which is to be proven. Prior art is prior art and acts as a prior initiative. Broad interpretations are not conjecture.

In reference to Applicant's argument:

The Examiner notes at the bottom of page 8 of instant Office Action that a set of breakpoints constitutes an interval. Applicant agrees, but argues that a set of breakpoints does not apply sequential binary numbers to intervals between the breakpoints, as taught and claimed in applicant's invention. Further, regarding applicant's claims 2 and 13, the Examiner stated that Lakshman anticipates the search performed on each axis is a binary search conducted by selecting breakpoints at which the bits change for the binary numbered intervals (p. 209 con. 2, lines 59-62). Again, applicant points out to tile Examiner that Lakshman clearly and unarguably does not teach binary numbered intervals, anal applicant respectfully requests that the Examiner please provide applicant with the specific language in the portion cited and applied above by the Examiner, which discloses this specific limitation.

Further to the above, the Examiner stated on page 8 of the instant Office Action, that Lakshman locates the binary numbered interval into which the point projects on each axis by performing a search on each axis for the numbered interval into which the point projects on that axis. Applicant must again reiterate to the Examiner that the reference nowhere teaches, suggests or intimates numbering Intervals, with binary numbers, and therefore cannot possibly locate the binary numbered interval into which the point projects

on each axis by performing a search on each axis for the numbered interval into which the point projects on that axis.

Examiner's response:

Para 3 and 8 above apply.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Claim 1 – 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Lakshman et al (ACM 1-58113-003, referred to as **Lakshman**).

Claim 1

Lakshman anticipates a first set of rules associating to the packets by values of the header fields (**Lakshman**, page 203, col 2, lines 29 – 35); and a classification system for selecting specific rules in the set of rules as applicable to a specific packet (**Lakshman**, page 203, col 2, lines 29 – 35); characterized in that the classification system projects the first set of rules as N-dimensional entities on N axes in N-dimensional space, marking the beginning and ending value on each axis for each rule as a breakpoint, assigns a sequence of binary numbers to each interval between breakpoints such that all adjacent intervals in ascending sequential order, associates a subset of the first set of rules as applicable in each interval to the assigned binary number of the appropriate interval between breakpoints on each axis, then considers a

packet as a point in the N-dimensional space according to its header field values, locates the binary number assigned to the interval into which the point projects on each axis by performing a search on each axis for the numbered interval into which the point projects on that axis, thereby determining rules applicable to the packet for that axis, and then determines the specific rules applicable to the packet from the subsets of rules by selecting those rules as applicable to the packet that apply to the packet on all of the N axes (**Lakshman**, page 208, col 2, lines 10 – 34; Fig. 4; Examiner's Note: a set of breakpoints constitutes an interval).

Claims 2, 13

Lakshman anticipates the search performed on each axis is a binary search conducted by selecting breakpoints at which the bits change for the binary numbered intervals (**Lakshman**, page 209, col 2, lines 59 – 62).

Claims 3, 14

Lakshman anticipates the search performed on each axis is a quatenary or higher-level M-ary search, where M is a power of 2, conducted by selecting breakpoints at which the bits change for the binary numbered intervals (**Lakshman**, page 209, col 2, lines 59 – 62; Examiner's Note: quatenary is a looped binary search which has rule depth limits).

Claims 4, 15

Lakshman anticipates association of applicable rules in each numbered interval is made by associating a binary string with each interval, with one bit dedicated to each rule. (**Lakshman**, page 208, col 2, lines 10 – 34).

Claims 5, 16

Lakshman anticipates the rules are associated to bit positions in the binary string by priority, the order of priority according to bit significance, and a final rule is selected by the most significant 1 in the matching rules. (**Lakshman**, page 208, col 2, lines 10 – 34).

Claims 6, 17

Lakshman anticipates the applicable rules are found by ANDing the binary strings determined for each axis over all axes. (**Lakshman**, page 208, col 2, lines 10 – 34).

Claims 7, 18

Lakshman anticipates at least one hardware pipeline for conducting the search on an axis, the pipeline comprising first, second, and sequential modules for accomplishing increasingly particular portions of the search, wherein, after the first module of the sequential modules is used, determined values from the first module pass to the second module, and values for a second packet enter the pipeline at the first module, the pipeline operations proceeding thus sequentially. (**Lakshman**, page 208, col 2, lines 36 – 39; page 209, col 1, lines 1 – 26).

Claims 8, 19

Lakshman anticipates parallel pipelines with one pipeline dedicated to searching on each axis in the N-dimensional space, wherein searches are conducted for applicable intervals simultaneously on each axis. (**Lakshman**, page 208, col 2, lines 36 – 39; page 209; col 1, lines 1 – 26).

Claims 9, 20

Lakshman anticipates applicable rules for each interval on each axis are represented by individual bitmaps, with each rule assigned a bit position, and wherein the outputs of the parallel pipelines, being the numbered interval on each axis into which the point for a packet projects, are exchanged for the associated bitmaps, which are then ANDed to determine the applicable rules. (**Lakshman**, page 208, col 2, lines 36 – 39; page 209; col 1, lines 1 – 26; page 208, col 2, lines 10 – 34).

Claims 10, 21

Lakshman anticipates searching is interleaved, results of searching on one or more axes being applied to other axes before searching on the other axes. (**Lakshman**, page 207, col 2, lines 55 – 57; Examiner's Note: Lakshman, using the best method related to the development of the system of Claim 1, extracts the jth element of every filter for all n filter rules where such element's reference must exceed one on the jth axis. In the conventional mathematical notation, if i is less than 1 or not defined, the respective jth axis has no value for the referenced rule. Since there must be an ith value for each rule in the jth dimension, Lakshman's algorithm anticipates an efficient search. The mathematical converse applicable to Lakshman's notation sets aside the rule covering the instance wherein the rule does not have an interval on one or more k axes.)

Claims 11, 22

Lakshman anticipates rules that are found by search to not apply on one or more axes are not considered in searches conducted on the other axes (**Lakshman**, page 207, col 2, lines 55 – 57; see above notation).

Claim 12

Lakshman anticipates projecting the rules as N-dimensional entities on N axes in dimensional space (**Lakshman**, page 207, col 2, lines 55 – 60); marking the beginning and ending value on each axis for each rule as a breakpoint (**Lakshman**, page 208, col 1, lines 7 – 10); assigning a sequence of binary numbers to intervals between breakpoints on each axis such that all adjacent intervals are numbered sequentially in ascending order; identifying those breakpoints at which bits in the interval numbers change (**Lakshman**, page 208, col 2, lines 10 – 34; Figure 4); associating a subset of the rules as applicable to the assigned number of each interval on each axis (**Lakshman**, page 208, col 2, lines 10 – 34); considering a packet as a point in the N-dimensional space according to values of the header fields for the packet (**Lakshman**, page 203, col 2, lines 29 – 35); determining by search the binary number of the interval on each axis into which the packet point projects (**Lakshman**, page 203, col 2, lines 29 – 35; page 208, col 2, lines 10 – 34); substituting the subset of rules that apply for each determined interval (**Lakshman**, page 208, col 2, lines 10 – 34); and selecting those rules as applicable to the packet that associate to the packet on all of the N axes (**Lakshman**, page 208, col 2, lines 10 – 34).

Claim 23

Lakshman anticipates conducting a first search on one or more axes (**Lakshman**, page 209, col 2, lines 56 – 62); and using information from the first search to simplify further searching on remaining axes (**Lakshman**, page 203, col 2, lines 19 – 25)

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence Information

Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner, Joseph P. Hirl, whose telephone number is (703) 305-1668. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anil Khatri can be reached at (703) 305-0282.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

or faxed to:

(703) 746-7239 (for formal communications intended for entry);

or faxed to:

(703) 746-7290 (for informal or draft communications with notation of "Proposed" or "Draft" for the desk of the Examiner).

Hand-delivered responses should be brought to:

Receptionist, Crystal Park II

2121 Crystal Drive,

Arlington, Virginia.

Joseph P. Hirl

Wilbert L. Starks, Jr.
Primary Examiner
Art Unit - 2121

September 16, 2003